

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

REMARKS/ARGUMENTS

Reexamination and reconsideration of this application as amended is requested. By this amendment, Claims 1-4, 14-18, 27, 28, 30, and 32, have been amended. After this amendment, Claims 1-36 remain pending in this application.

Applicants would like to thank the Examiner for allowance of Claims 29-36.

Claim Rejections - under 35 USC § 102

(1-2) The Examiner rejected Claims 1-3 and 15-17 under 35 U.S.C. 102(e) as being anticipated by Rom (U.S. Patent Application Publication US2002/0146170 A1).

not supported (Applicants have amended Claims 1-3 and 15-17 to more clearly and distinctly recite the present invention. The claims now more clearly and distinctly recite that the location information of the pen stroke data is compared with the bit image of the form, as recited for independent Claim 1, and for all dependent claims depending therefrom, respectively, and being compared with the bit image of at least one data entry field in the bit image of at least one form, as recited for independent Claim 15 and for all dependent claims depending therefrom, respectively. Support for this amended claim language may be found in the specification as originally filed, see for example from page 13, line 19, to page 15, line 17, which can also be found in paragraphs [0049] to [0054] in the USPTO published patent application document. No new matter was added. The relevant cited text is provided below for quick reference.

[0049] Once the collection of strokes has been closed, a box is defined which is the bounding box of all points in the collection of strokes. This bounding box may then be compared with boxes representing the fields of different forms to find the boxes that most closely match it. One embodiment of the form identification procedure finds the page for which the total distance between the corners of these bounding boxes and the field boxes on the form template is at a minimum. The following improvement defines a different method of form identification. Since the box surrounding the handwritten text may frequently be larger than the form field because tall characters or characters with descenders, such as g

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

or q, will frequently stray outside the bounding box of the entry field. For this reason it would be good to have a box representing the text which would not extend beyond the edges of the field even if the user's writing occasionally strays outside of that region.

[0050] The present embodiment calculates the average horizontal line above and below which the writing is formed and considers the box which extends one standard deviation in above and below this average value, where the standard deviation is defined by the vertical positions of all of the other points in the stroke collection for this isolated block of writing. This is illustrated by FIGS. 6A-B. In FIG. 6A, a portion 14 of a form is illustrated which shows the locations of data entry fields. In FIG. 6B, handwritten text is shown written in the data entry fields of the portion 14 of a form. This can be seen in this figure, the lower case letter "g" has a descender which extends below its data entry field.

[0051] For a given collection of points, this embodiment calculates a box whose right and left edges are defined by the minimum and maximum X values of the data and whose top edge is defined by the average Y value of the input data plus one standard deviation of the Y values and the bottom edge is defined by the average value of Y minus the standard deviation. In the preferred embodiment, the height of the box is twice the standard deviation. However, those skilled in the art will recognize that this height can also be computed as a fraction of the standard deviation, a multiple of the standard deviation, or a different function of the variation of Y values.

[0052] The next step is to identify fields on the forms. A form is a set of scanned images, each representing one page of the form. For each page of the form, find the complete set of the largest rectangular boxes that contain no black pixels. This algorithm includes a threshold allowing it to ignore isolated islands of a few pixels that may be due to dirt on the scanner, stray marks on the form, etc.

[0053] Once the form fields are identified, the next step is to match data to the form fields. This operation matches the bounding boxes of stroke collections (as described above) with bounding boxes of fields on the forms. For a given set of raw data (e.g. a file of ink stroke data), it is assumed that all matched fields will belong to a single form.

[0054] An alternative method of associating pen stroke data with the correct form is to perform a boolean AND operation on the bitmap representing the empty form and a bitmap representing the user input data. Since the user entered data should always appear over the white spaces on the form and never (or rarely) over printing or lines on the form, the user data page which has the least number of overlapping bits with a given form page is a likely candidate for that form page. In particular, if the sum

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

of overlapping bits for the complete set of user input pages (in order) when ANDed with the set of pages for a given form is minimum, that is the correct form.

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As has been discussed above, the presently claimed invention, as recited for amended independent Claims 1 and 15, and for all dependent claims depending therefrom, respectively, does a comparison of the location information of the pen stroke data to the bit image information of the forms. This automatic comparison of bit image information to determine the entry of pen stroke data in fields of forms is a very useful and valuable feature of the presently claimed invention. Note that a user of the system does not have to pre-determine the location of fields on forms and enter this field location identifying information into a database along with the image of the corresponding forms. A user can simply enter the bit images of the forms for comparison. This can be done even after the pen stroke data of data entry has been already captured and stored. After the form images are in the system, the system automatically determines pen stroke data entered in fields of forms based on the comparison of bit image information. This is a very efficient and simple process for users of the new and novel systems according to the present invention.

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Rom's system, on the other hand, utilizes form templates having field locating information and field type information that are stored in, and then accessed from, a form template database. See FIG. 5, with particular reference to 502, 506, 508, 510, and 512, and see paragraph [0025]. The form field location identifying information is stored (as separate information) in the form template database to enable the identification of the location of a form field in an associated form template. Then, after input of a data image including entered data, the location of a datum located in the data image is compared with the location identifying information of the form field stored in the form template (i.e., identified by pre-specified and pre-stored form field boundaries stored in the template database) to determine the existence of datum within the field boundaries of a form represented by a form template in a plurality of form templates in the database.

As can be appreciated, the Rom system requires that form templates be created and stored in a database such that form field location identifying information is stored (as

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

separate information) in the form template database to enable the identification of the location of a form field in a form associated with a form template. Then, the determined location of a datum (e.g., indicating user entered data) in a captured data image is compared to the stored form field location identifying information (i.e., identifying form field boundaries in a form) associated with form templates stored in a form template database. This comparison is then used in a process (as shown in FIG. 5) to determine the best matching form template. The Rom form-template-driven system, therefore, is different than the presently claimed system, as recited for independent Claims 1 and 15.

As discussed above, the presently claimed system provides many advantages to users and operators of the system. There is no need to create and store form templates, and particularly there is no need to manually figure out and provide form field boundaries specification stored in the database. This additional complexity is avoided by the presently claimed system, which provides significant added value and utility to users of the system.

Therefore, in view of the amendment and remarks above, Applicants believe that since Rom does not teach, anticipate, or suggest, the presently claimed system as discussed above, the rejection of Claims 1-3 and 15-17 under 35 U.S.C. 102(e) has been overcome. The Examiner should withdraw the rejection of these claims.

Claim Rejections - 35 USC § 103

(3-5) The Examiner rejected Claims 14 and 27 under 35 U.S.C. 103(a) as being unpatentable over the combination of Rom (U.S. Patent Application Publication US2002/0146170 A1) to Clary et al. (U.S. Patent 6,259,043). The Examiner combined the teachings of Clary with Rom to arguably obviate the additional limitations under dependent Claims 14 and 27, such as to determine whether content information from the pen stroke data contains content identifiable data corresponding to a particular form to aid the process in the selection of a particular form.

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

Applicants have amended independent Claims 1 and 15 to more clearly and distinctly recite the present invention. As has been discussed above, amended independent Claims 1 and 15 more clearly and distinctly recite that the location information of the pen stroke data is compared with the bit image of the form, as recited for independent Claim 1, and for all dependent claims depending therefrom, respectively, and being compared with the bit image of at least one data entry field in the bit image of at least one form, as recited for independent Claim 15 and for all dependent claims depending therefrom, respectively. Support for this amended claim language may be found in the specification as originally filed, see for example from page 13, line 19, to page 15, line 17, which can also be found in paragraphs [0049] to [0054] in the USPTO published patent application document. No new matter was added. The relevant cited text is provided above (see Applicants' response to Examiner's rejection under 35 U.S.C. 102(e)) for quick reference.

check Please note that Applicants have already discussed above (see Applicants' response to Examiner's rejection under 35 U.S.C. 102(e)) in detail how Claims 1 and 15, and all dependent claims depending therefrom, recite different and distinct features and functions than the teachings of Rom. Specifically, the presently claimed invention compares the location information of the pen stroke data with the bit image of the form, as recited for independent Claim 1, and for all dependent claims depending therefrom, respectively, and compares the location information of the pen stroke data with the bit image of at least one data entry field in the bit image of at least one form, as recited for independent Claim 15 and for all dependent claims depending therefrom, respectively. This is very different than Rom's comparison to the field identifying information stored (as separate data identifying field boundaries) in the form templates in the form template database.

Clary's teachings are also different than the presently claimed invention. Clary for example utilizes data entry (or a push of a button) from a user to indicate a new page event, such as a new page number. This instructs the Clary system to switch pages and then subsequent pen strokes from the user are associated with the new page. See column

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

6, lines 15-48. Clary's system does not teach or suggest that location information of the pen stroke data can be compared with the bit image of at least one form, or with the bit image of at least one data entry field in the bit image of at least one form, to select the electronic image of the form related to the form on which the data was entered.

Claims 14 and 27 depend from amended Claims 1 and 15 respectively and, since dependent claims recite all of the limitations of the independent claim, it is believed that, therefore, these claims also recite in allowable form.

Accordingly, in view of the amendments and remarks above, since neither Rom, Clary, nor any combination of the two cited references, teaches, anticipates, or suggests, the presently claimed system and method, as recited for dependent Claims 14 and 27, Applicants believe that the rejection of Claims 14 and 27 under 35 U.S.C. 103(a) has been overcome. The Examiner should withdraw the rejection of these claims.

Allowable Subject Matter

(7) The Examiner objected to Claims 4-13, 18-26 and 28, but indicated these claims would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims.

Applicants have amended Claims 4, 18, and 28 to comply with the Examiner's request. These claims now recite in independent form including all limitations of the base claim and any intervening claims. It is therefore believed that these independent Claims 4, 18, and 28, are allowable. Claims 5-13 and 19-25 depend from amended independent Claims 4 and 18, respectively, and, since dependent claims recite all of the limitations of the independent claim, it is believed that, therefore, these dependent Claims 5-13 and 19-25 also recite in allowable form.

Therefore, Applicants submit that Claims 4-13, 18-26 and 28 are allowable, and request that the Examiner allow these claims to issue.

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

Applicants wish to acknowledge that the Examiner allowed Claims 29-36. Applicants, however, have amended Claims 30 and 32 to correct minor formalities, i.e., to add the word "and" after the previous to the last method step in a claim to properly link a list of method steps in a claim, and not in any way for patentability or to further limit the amended claims in view of any prior art. No new matter was added.

Conclusion

The foregoing is submitted as full and complete response to the Official Action mailed October 1, 2003, and it is submitted that Claims 1-36 are in condition for allowance. Reconsideration of the rejection is requested. Allowance of Claims 1-36 is earnestly solicited.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless Applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

Applicants acknowledge the continuing duty of candor and good faith to disclosure of information known to be material to the examination of this application. In accordance with 37 CFR §§ 1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment are limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is knowingly surrendered and everything else is unforeseeable at the time of this amendment by the Applicants and the attorneys.

The present application, after entry of this amendment, comprises thirty-six (36) claims, including six (6) independent claims. Applicants have previously paid for thirty-six (36) claims including three (3) independent claims. Applicants, therefore, believe that an additional fee of \$129 [= 3 * \$43.00] for claims amendment is currently due. The Commissioner is hereby authorized to charge the required fee for claims amendment of

Appl. No. 09/728,538
Amdt. dated April 1, 2004
Reply to the Office Action of October 1, 2003

(\$129.00), or if this fee amount is insufficient, then the Commissioner is authorized to charge the appropriate fee amount to prevent this application from becoming abandoned, to Deposit Account 50-1556.

Additionally, a petition for a three month extension of time to file this Response has been attached to this Response. The Commissioner is hereby authorized to charge the extension fee for response of (\$475.00), or if this fee amount is insufficient, then the Commissioner is authorized to charge the appropriate fee amount to prevent this application from becoming abandoned, to Deposit Account 50-1556.

If the Examiner believes that there are any informalities that can be corrected by Examiner's amendment, or that in any way it would help expedite the prosecution of the patent application, a telephone call to the undersigned at (561) 989-9811 is respectfully solicited.

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 50-1556.

In view of the preceding discussion, it is submitted that the claims are in condition for allowance. Reconsideration and re-examination is requested.

Respectfully submitted,

Date:

4/1/04

By:



Jose Gutman
Reg. No. 35,171

**Please send all correspondence concerning
this patent application to:**

Jose Gutman, Esq.
FLEIT, KAIN, GIBBONS, GUTMAN
BONGINI & BIANCO P.L.
551 N.W. 77th Street, Suite 111
Boca Raton, FL 33487
Tel (561) 989-9811 Fax (561) 989-9812